

APPENDIX G-LU1 AGRICULTURAL RESOURCES

G-LU1.1 INTRODUCTION

This appendix provides additional information regarding the methodology used to assess potential effects on agricultural resources, along with a more-detailed description of the affected environment. Most of the material included in this appendix, and all of the environmental consequences information contained below, focuses on the issue assessed in the Preliminary Draft Environmental Assessment (PDEA): potential effects on water temperatures at Thermalito Afterbay and related agricultural diversion points. Such temperature impacts could in turn affect rice yields and production. Rice yields and production are affected by many factors, with water temperature being one.

G-LU1.2 METHODOLOGY

The original intent was to evaluate the Proposed Action and Alternative 2 compared to the number of accumulated hours below each rice production water temperature index value during the period of the analysis to the accumulated hours below the same rice production water temperature index values that would occur under the No-Action Alternative. However, hourly water temperature model data were not available. Daily mean water temperatures available at the agricultural diversion locations were not adequate to support the analyses; therefore, a qualitative analysis of water temperature changes at the agricultural diversions was conducted.

Qualitative effects assessments were completed to evaluate the potential effects of the alternatives on agricultural production in the vicinity of the Oroville Facilities. Qualitative effects evaluations of the alternatives included potential effects of operations-induced water temperature changes on rice production, the potential for conversion of prime farmland due to construction or project-related erosion, and conflicts in land use due to adjacent changes in land use. Both the land use changes and land use conflicts were based on qualitative evaluations of the type of change or conflict and the amount of area affected. Changes in water quality or groundwater tables were evaluated based on their suitability for agricultural production associated with groundwater quality and depth, as well as crop drainage effects on agricultural resources. Other qualitative analyses included the evaluation of changes in the rate and type of contribution of aquatic weeds into the agricultural diversions and distribution systems from Thermalito Afterbay. This evaluation included effects on irrigation district operations, as well as effects on aquatic weed management practices for rice production.

G-LU1.3 AFFECTED ENVIRONMENT

The Oroville Facilities provide water for agricultural diversions to senior water rights holders in Butte and Sutter Counties. Agricultural operations in these counties enjoy major benefits from the Oroville Facilities through improved water supply reliability for agricultural diversions and flood management that makes much of their agricultural production possible. The Oroville Facilities also have the potential to affect agricultural

resources in several ways, including influencing water temperatures at agricultural diversions, changing the groundwater table, changing water quality, converting farmland through project-related construction or from erosion attributable to Oroville Facilities releases, and contributing aquatic weeds and weed seeds from Thermalito Afterbay into the agricultural irrigation distribution and conveyance system.

California is the number one agricultural producer in the United States, earning \$27.6 billion in agricultural markets in 2001. The total land acreage dedicated to farming in California is 27.7 million acres, and 13 percent of the national gross cash receipts from farming can be attributed to California farming products (California Department of Food and Agriculture 2002). Rice ranks as the 32nd most valuable agricultural commodity produced in California. In 2001, rice production accounted for \$209 million of the agricultural production value in California, or approximately 1 percent of California's total gross cash income from farming (California Department of Food and Agriculture 2002). The top three counties for rice production in California are Colusa (25.3 percent of the total value), Sutter (19.1 percent), and Butte (18.7 percent) (CASS Website).

Historically, Butte County has been an agriculturally based county, and commercial agriculture continues to be the county's principal economic base (see Section 5.12, Socioeconomics, for additional information on agricultural economics in Butte and Sutter counties). The Feather River and groundwater are the largest sources used to meet the county's water demands. Butte County had approximately 381,532 acres of farmland in 2002 (NASS 2004), and farming accounted for 41.6 percent of the county's total inventoried land area of 917,909 acres (Farmland Mapping and Monitoring Program 2004a). The region supported approximately 256,519 acres of total cropland, of which 222,735 acres were irrigated land (NASS 2004). Rice is the highest total value crop grown in Butte County. Approximately 94,700 acres of rice were harvested in Butte County, which constituted approximately 18.7 percent (\$101.2 million) of the value of California's rice production in 2002 (CASS Website). Other major crops in the county are almonds, walnuts, and plums. Figure G-LU1.3-1 shows rice yields over time for Butte and Sutter Counties.

It is apparent that the yield has increased over time. Sutter County has a highly agricultural economy. Sutter County's water supply includes surface water from the Feather and Sacramento Rivers, other surface water, surface water reuse, and groundwater wells (USBR et al. 2004). In 2002, there were 1,391 farms occupying 371,964 acres (NASS 2004) of the 389,439 total acres inventoried in the county (Farmland Mapping and Monitoring Program 2004b). The main agricultural commodities in 2002 were rice, dried plums, peaches, and walnuts. Sutter County accounted for 19.1 percent (\$103.1 million) of California's total rice production value in 2002 with more than 96,000 acres of rice having been harvested (CASS Website).

Rice is cultivated in the majority of the area of agricultural production in the Feather River Service Area (FRSA) (see Figure G-LU1.3-2). Heavy red and gray clay soils and their associated low-water infiltration rate characteristics make much of the areas to the northwest, west, and southwest of the Oroville Facilities ideal for rice production. These

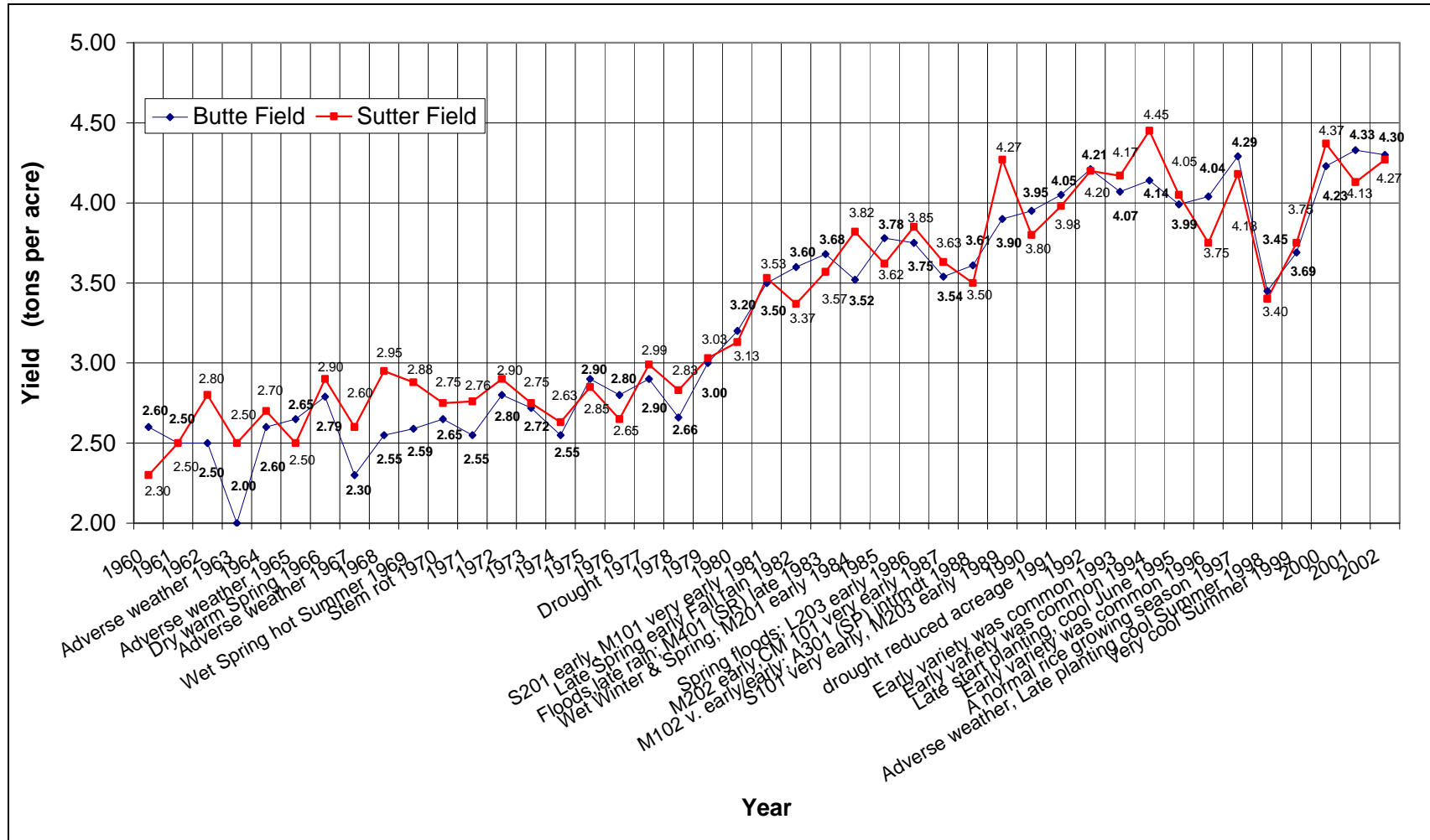


Figure G-LU1.3-1. Butte and Sutter County Rice Yield.

soil types also limit crop selection alternatives and account for the general monoculture of rice production in these areas. (See Section 5.3, Geology and Soils, for additional information on soil types.) Crop types that occur downstream of Thermalito Afterbay along the Feather River include field crops, pasture, deciduous fruit, and nuts. Other agricultural land uses occur adjacent to the Oroville Facilities, including dryland grain farming, grazing, truck crops, nurseries, ranchettes, and forestry upland of the Oroville Facilities.

As part of the Land Inventory and Monitoring (LIM) system developed by the U.S. Department of Agriculture (USDA), definitions were established for designations of Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance. Farmland maps are created by the Farmland Mapping and Monitoring Program (FMMP), under the direction of the USDA. The FRSA farmland designations are provided in Figure G-LU1.3-3.

Prime Farmland is land that has been deemed to encompass the best combination of physical and chemical characteristics for the production of crops. If treated and managed according to current farming methods, Prime Farmland has the soil quality, growing season, and moisture supply to produce sustained high yields of crops. Criteria for ten factors have been established, and for farmland to be designated, it must meet the criteria for all ten aspects. Established criteria include those for water, soil temperature range, acid-alkali balance, water table, soil sodium content, flooding, erodibility, permeability, rock fragment content, and rooting depth.

Farmland of Statewide Importance includes lands not designated as Prime Farmland that have a good combination of physical and chemical characteristics for the production of crops. Eight of the above listed criteria for Prime Farmland must be met to allow for a designation of Farmland of Statewide Importance. Criteria for permeability and rooting depth are not restrictive of designation for this categorization of farmland.

Unique Farmland cannot be either Prime Farmland or Farmland of Statewide Importance, as it is land that does not meet the criteria for either land designation. However, Unique Farmland exhibits a particular combination of soil quality, location, growing season, and moisture supply such that the land produces a sustained high quality and/or high yield of a specific crop (e.g., oranges, avocados, rice) when managed according to current farming methods. Unique Farmland tends to be used for specific high-value crops, of which favorable conditions exist for the growth of the specific crop on the particular parcel of land. High-value crops are determined by the California Department of Food and Agriculture and are listed in its annual publication *California Agriculture* (California Department of Food and Agriculture 2002).

The total acreage of each type of farmland designation in each water district, as determined by the FMMP, is provided in Tables G-LU1.3-1 and G-LU1.3-2. Approximately 6,300 acres of Prime Farmland within Sutter County are located in the FRSA. An interim mapping study has been conducted for Butte County. Where no farmland mapping study is conducted, an interim mapping study is conducted, and designations of land are made as either Irrigated Farmland or Non-irrigated Farmland.

**Table G-LU1.3-1. Farmland Mapping and Monitoring Program summary for Butte County
by water district service area.**

	Other		Irrigated Farmland*		Non-irrigated Farmland*		Unique Farmland		Farmland of Statewide Importance		Prime Farmland		Total	
	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%
Western Canal WD	4,828	7	61,210	93	33	0	0	0	0	0	0	0	66,038	100
Richvale ID	5,079	14	32,287	86	0	0	0	0	0	0	0	0	37,366	100
Butte WD	2,215	12	15,617	88	60	0	0	0	0	0	0	0	17,832	100
Biggs-West Gridley WD	5,770	17	27,984	83	0	0	0	0	0	0	0	0	33,754	100

Notes: ID = Irrigation District; WD = Water District. Butte County contains only Interim Farmland map categories.

* Two categories of Interim Farmland, Irrigated Farmland and Non-irrigated Farmland, are mapped in lieu of Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance. No Farmland of Local Importance occurs within the water district service areas of concern in Butte County. The "Other" category represents Grazing Land, Urban and Built-up Land, Other Land, Water, and Areas Not Mapped.

Source: Farmland Mapping and Monitoring Program 2004a

Table G-LU1.3-2. Farmland mapping and monitoring summary for Sutter County by water district service area.

	Other		Irrigated Farmland*		Non-irrigated Farmland*		Unique Farmland		Farmland of Statewide Importance		Prime Farmland		Total	
	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%
Butte WD	3,126	8	0	0	0	0	130	0	27,262	74	6,278	17	36,796	100
Biggs- West Gridley WD	283	7	0	0	0	0	1,817	45	1,892	47	26	1	4,018	100

Notes: ID = Irrigation District; WD = Water District. Sutter County utilizes an Important Farmland Mapping system compiled by the FMMP.

* The categories "Irrigated Farmland" and "Non-irrigated Farmland" are only used for Interim Farmland Maps. Therefore, no lands within the water district service areas of concern in Sutter County are designated as either Irrigated Farmland or Non-irrigated Farmland. No Farmland of Local Importance occurs within the water district service areas of concern in Sutter County. The "Other" category represents Grazing Land, Urban and Built-up Land, Other Land, Water, and Areas Not Mapped.

Source: Farmland Mapping and Monitoring Program 2004b

The interim designations collectively represent the four categories of farmland and are intended to be renamed once advanced soil surveys are conducted. The total number of acres of farmland within the FRSA, as listed in Tables G-LU1.3-1 and G-LU1.3-2, represents the agricultural resource area potentially affected by Oroville Facilities operations.

Under existing environmental commitments, the California Department of Water Resources (DWR) operates the Oroville Facilities to meet water temperature objectives in the Feather River for aquatic species survival and to meet salinity requirements in the Sacramento–San Joaquin Delta.

Several water districts in the Feather River watershed diverted water from the Feather River prior to construction of Oroville Dam. DWR entered into agreements with certain water districts to provide them with water based upon these prior rights (DWR 1969). The agreement among Richvale Irrigation District, Biggs–West Gridley Water District, Butte Water District, Sutter Extension Water District (i.e., the Joint Water District), and DWR includes terms describing the amounts of water that the State shall make available to the districts. This May 1969 agreement states that the “Districts shall have the right to divert from the Feather River at the Afterbay Diversion Structures each Irrigation Season, five hundred sixty thousand (560,000) acre-feet of water of the Feather River up to and including the year 1980 and five hundred fifty-five thousand (555,000) acre-feet each Irrigation Season thereafter” (DWR 1969). The May 1969 agreement between DWR and the Joint Water District does not contain any specific water temperature or water quality goals or criteria. The primary water use of FRSA-diverted water is for agricultural irrigation, although some water is allocated for habitat production (USBR et al. 2004). The irrigation districts in the FRSA deliver water from the Oroville Facilities to approximately 195,800 acres of farmland in Butte and Sutter counties.

Thermalito Afterbay was constructed on permeable geologic material, resulting in seepage of water into the local groundwater basin. Two effects of groundwater table elevation could be of potential concern for agricultural purposes. If the water table in the vicinity of the Oroville Facilities project area were to decrease, then at a certain low level there would be increased costs to agricultural users as a result of increased pumping costs. Another possible effect of groundwater table elevation on agricultural resources would occur if the water table were high enough to affect agricultural drainage systems or crop root zones.

Additionally, the Oroville Facilities could potentially affect surface water or groundwater quality, which could affect agricultural resources. Results from Phases 1 and 2 of Study W-5, *Project Effects on Groundwater*, do not indicate any adverse effects on groundwater levels or quality in the project area from the Thermalito Forebay or Thermalito Afterbay. If there are any subtle effects on groundwater from the Oroville Facilities, the effects would be beneficial because groundwater levels would be recharged from the Oroville Facilities and the high mineral content of the groundwater would be diluted with surface water containing much lower mineral levels, resulting in better suitability for all beneficial uses.

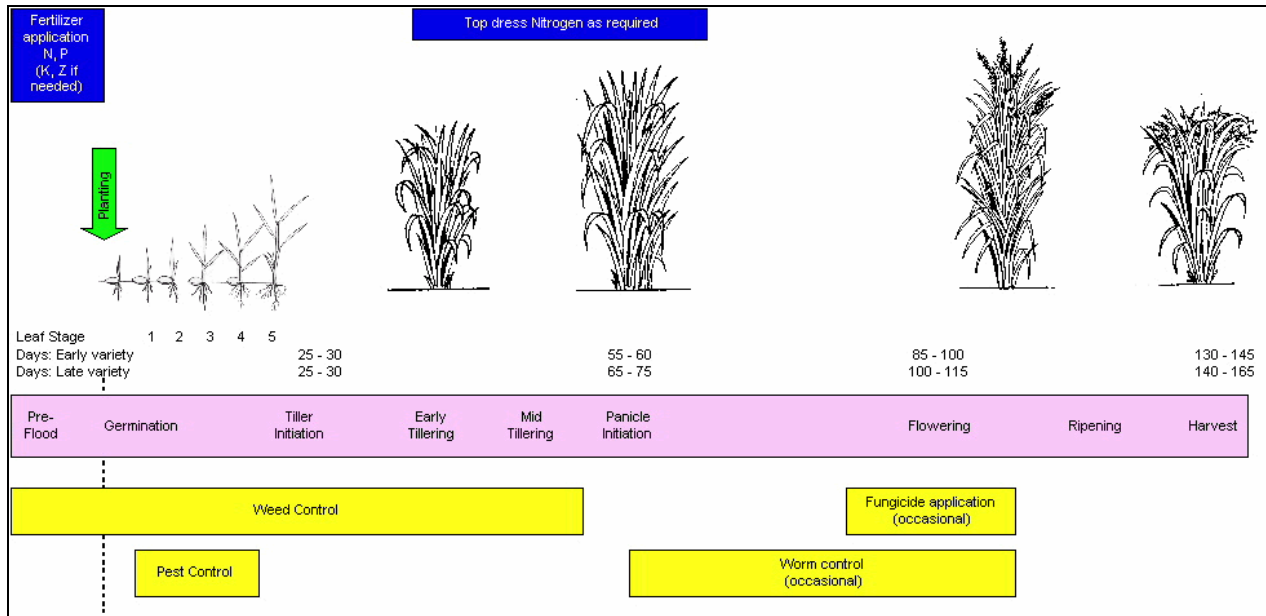
DWR conducts aquatic weed management in Thermalito Afterbay for water primrose and other native and exotic plant species present in the afterbay. The possibility exists that aquatic weeds from Thermalito Afterbay could become entangled in irrigation district diversions or block water turnouts. The occurrence of such entwinements could potentially require maintenance or other operational activities and service in the irrigation district diversion structures and conveyance system. In addition to aquatic weeds, several control/eradication projects in the vicinity of Lake Oroville for exotic or invasive weed species are currently conducted. These include chemical treatment of parrot's feather by the California Department of Fish and Game (DFG) and local irrigation districts and general weed control using chemical and mechanical efforts by the irrigation districts. (See Section 5.6, Terrestrial Resources, for additional information about weed management efforts.)

G-LU1.3.1 Agricultural Production and Cultural Practices

Irrigation water is an essential component of high-value agricultural crop production. Agricultural cropland is often irrigated before crop planting in the spring to leach accumulated salts out of the crop root zone and to recharge the moisture availability of the soil profile. Crops are irrigated at frequent intervals during the growing season; in the case of rice production, irrigation is nearly continuous, with the exception of some periods of water holding and recirculation for specific cultural practices related to herbicide and insecticide applications. In the case of rice production, the field is often flooded after harvest to facilitate rice straw decomposition and provide waterfowl habitat. Because rice is the dominant crop type grown in the FRSA and is potentially affected by FRSA water temperatures, the remainder of this section focuses on rice production practices as they relate to the effects of water temperatures.

Rice production typically occurs on clays or other poorly drained soils with impervious layers. These soil types are fairly impermeable to water, which increases their water use efficiency. Rice is an aquatic crop requiring almost continuous flooding until the time of harvest. Fields intended for rice crop seeding are typically initially flooded in April and May, which accounts for the peak in agricultural water diversion volumes during this time period. Planting is done primarily in April and May.

Rice plants go through five growth stages: germination, tiller initiation, panicle initiation, flowering, and harvest (see Figure G-LU1.3-4). Germination occurs very shortly after planting and lasts about 5 days. In both early and late varieties of rice, tiller initiation occurs 25–30 days after planting. The timing of panicle initiation is different for early and late varieties of rice. For early varieties of rice, panicle initiation occurs within 55–60 days of germination. Late varieties reach the panicle initiation stage 65–75 days after germination. The flowering stage is reached at 85–100 days in early varieties of rice and 100–115 days in late varieties of rice. Harvest occurs between 130 and 145 days for early rice varieties and between 140 days and 165 days for late rice varieties.



Source: California Rice Research Board Website 2004

Figure G-LU1.3-4. Rice growth and cultural practice timeline.

Continually flowing water is needed for rice production. The total water use for growing rice is similar to that used to grow alfalfa or cotton, even though the rice fields are flooded most of the season. Water is reused and pumped back through a rice paddy several times before it is released back into the main water channel. Rice paddies are laser-leveled or contoured so that there is a slight slope within the field to aid in the flow of water. Berms or checks are constructed to control the flow of water over the growing rice and to ensure that there is an equal water depth within each basin (UC Cooperative Extension Rice Project Website). Water depth management in the rice paddy is important for weed control, rigorous rice crop growth, and management of potential plant diseases. Pest management during rice cultivation often requires the use of pesticide applications. Under State regulations, treated waters are required to be held within fields to facilitate the breakdown of pesticides before draining. Holding water for the extended period of time required for decomposition of chemical pesticides can cause stress to rice if tailwater is not managed properly (UC Cooperative Extension Rice Project Website).

After the panicle initiation, the water level in the rice paddy is often raised to protect the reproductive organs of the plant from colder air temperatures at night. Sterility may occur if the panicle is exposed to air temperatures below 55 degrees Fahrenheit (°F) 10–15 days before heading (UC Cooperative Extension Rice Project Website). Fields are not drained until the panicle is fully tipped and brown. Early drainage can result in low milling yields from breaking or cracking at harvest if the kernels are not completely filled (UC Cooperative Extension Rice Project Website).

To avoid the losses associated with coldwater effects, some growers use “warming checks,” which are areas of the field at the turnout dedicated to a water warming basin where either: (1) there are no crop inputs, or (2) increased yield losses associated with

the cold water are expected. Warming checks can vary in size from approximately 1 to 5 acres depending on the inlet water temperatures and the volume of water flowing into the field, which is determined in part by the size of the field. Another strategy used for water temperature management in the field is the use of tailwater recirculation to blend warm water from the tail end of the field with the cooler water at the field inlet.

Qualitative effects assessments were completed to evaluate potential effects on agricultural resources with implementation of the alternatives. Qualitative effects evaluated included: (1) conversion of Prime Farmland resulting from construction or erosion attributable to Oroville Facilities project releases; (2) changes in cultural practices due to noxious weeds, conflicts with recreational uses, or restrictions to the application of agricultural inputs due to changes in adjacent land uses or recreation; and (3) changes in agricultural production due to groundwater table elevations, water quality, or potential effects of changes in water temperature on rice production.

G-LU1.4 NO-ACTION ALTERNATIVE

G-LU1.4.1 Prime and Other Farmland

The qualitative effects evaluation of the No-Action Alternative included the potential for conversion of Prime Farmland due to construction activities or project-related erosion, as well as conflicts due to adjacent changes in land use. No construction activities that result in conversion of Prime or other farmland are included under the No-Action Alternative; therefore, no change in the status of Prime Farmland or other land use designations of lands surrounding the project area is anticipated. In addition, erosion rates and conversion of Prime Farmland due to erosion in the lower Feather River are not expected to increase above existing condition levels as a result of future project operations under the No-Action Alternative. (See Section 5.3.1, Geology and Soils, for additional information on lower Feather River erosion effects.) Prime and other farmland designations under the No-Action Alternative are unlikely to change from current land use designations. Therefore, no loss of Prime Farmland or other farmland is anticipated under the No-Action Alternative.

G-LU1.4.2 Agricultural Cultural Practices

Potential changes in the rate and type of contribution of aquatic weeds into the agricultural diversions and distribution systems from Thermalito Afterbay were qualitatively evaluated. This evaluation included effects on irrigation district operations, as well as effects on aquatic weed management practices for rice production. No changes in Thermalito Afterbay operations are anticipated to occur under the No-Action Alternative; therefore, it is anticipated that the rate and type of weed contribution from the afterbay into the agricultural diversion system under the No-Action Alternative would not differ from the rate and type of weed contribution under existing conditions. Under the No-Action Alternative, it is anticipated that more visitors to the area would result in some increased traffic flows in the vicinity of agricultural fields. (See Section 5.10, Recreation Resources, for additional information on changes in recreation visitation under the No-Action Alternative.) However, the patterns and seasonality of the potential

increased traffic in proximity to agricultural areas would be limited and are anticipated to have no effect on agricultural practices and equipment transit.

No new recreation facilities development is included in the No-Action Alternative; therefore, no changes in restrictions on agricultural spraying activities would occur under the No-Action Alternative. Therefore, no effects are anticipated on agricultural cultural practices due to improvement or development of recreational facilities such as picnic areas, campsites, or boat ramps under the No-Action Alternative relative to existing conditions.

G-LU1.4.3 Agricultural Production

Changes in water quality or groundwater tables were qualitatively evaluated based on their suitability for agricultural production associated with groundwater quality and depth, as well as crop drainage effects on agricultural resources. Currently, groundwater quality and water table depth do not adversely influence agricultural production in the project vicinity. No changes in project operations are anticipated to occur at Thermalito Afterbay under the No-Action Alternative; therefore, no changes in water quality or water table elevations influencing agricultural resources are expected to occur.

Under the No-Action Alternative, operations in Thermalito Afterbay would not differ appreciably from the operations under existing conditions during the May 1 through June 30 period of rice production yield sensitivity to irrigation water temperatures. Therefore, the Thermalito Afterbay water temperature regime is not expected to significantly change under the No-Action Alternative from the water temperature regime observed under existing conditions. Some changes in future water demand patterns occur in the No-Action Alternative as compared to the existing conditions, which alter the seasonal pattern of flow releases from the project. (See Section 5.4.1.2, Water Quantity, for additional information on flow changes associated with the primary project alternatives.) Because changes to the effective residence time of water in Thermalito Afterbay and afterbay release changes are small, these potential changes from the existing condition to the No-Action Alternative conditions likely would not effect affect water temperatures at the agricultural diversions as compared to the existing conditions.

Under the No-Action Alternative, Thermalito Afterbay operations would not differ from existing operational procedures. Water temperatures in Thermalito Afterbay at the agricultural diversion points under the No-Action Alternative were therefore expected to be similar to those observed under existing conditions. Agricultural production under the No-Action Alternative, according to the above qualitative analyses, is therefore not expected to change relative to existing conditions.

G-LU1.5 PROPOSED ACTION

G-LU1.5.1 Prime and Other Farmland

The qualitative effects evaluation of the Proposed Action included the potential for conversion of Prime Farmland due to construction activities or project-related erosion,

as well as conflicts due to changes in adjacent land use. No construction activities are included with implementation of the Proposed Action that would affect Prime or other farmland; therefore, no change in the status of Prime Farmland or other land use designations of lands surrounding the project area is anticipated. In addition, the erosion rates and conversion of Prime Farmland due to erosion are not expected to change from No-Action Alternative conditions, as no changes in flow are included in the Proposed Action. Prime and other farmland designations with implementation of the Proposed Action are unlikely to change from current land use designations. Therefore, no loss of Prime Farmland or other farmland is anticipated with the implementation of the Proposed Action.

G-LU1.5.2 Agricultural Cultural Practices

Potential changes in the rate and type of contribution of aquatic weeds into the agricultural diversions and distribution systems from Thermalito Afterbay were qualitatively evaluated. An invasive species management plan to reduce noxious non-native plant species is included in the Proposed Action. (See Section 3.2.3 for an additional description of this program.) The invasive species management plan included in the Proposed Action is anticipated to reduce the rate and type of weed contribution from the afterbay into the agricultural diversion system. Terrestrial and noxious weed management programs, as well as exotic and invasive weed management programs, should decrease the occurrence of weeds and weed seed in Thermalito Afterbay. Potentially, management actions could reduce the quantity of weeds in the agricultural diversion facilities contributed by Thermalito Afterbay. (See Section 5.6, Terrestrial Resources, for additional information on weed management programs in Thermalito Afterbay.)

Increased recreation facilities and visitation included with implementation of the Proposed Action could conflict with agricultural cultural practices. (See Section 5.10, Recreation Resources, for additional information on proposed recreational improvements.) Additional opportunities to recreate would result in increased visitation to the area, thereby increasing traffic flows in the vicinity of agricultural fields. However, the patterns and seasonality of the potential increased traffic in proximity to agricultural areas are anticipated to have no effect on agricultural practices and equipment transit.

Facility development, including new and/or improved campsites, could cause restrictions on agricultural spraying activities. Recreational development and associated activities adjacent to Oroville Facilities are anticipated to be consistent with and in proximity to current recreation projects in place at Lake Oroville and the Thermalito Complex. Therefore, no effects are anticipated on agricultural cultural practices with implementation of the Proposed Action due to improvement or development of recreational facilities such as picnic areas, campsites, or boat ramps.

G-LU1.5.3 Agricultural Production

Changes in water quality or groundwater tables were evaluated based on their suitability for agricultural production associated with groundwater quality and depth, as well as

crop drainage effects on agricultural resources. Currently, groundwater quality and water table depth do not adversely influence agricultural production in the project vicinity. No changes in project operations are anticipated to occur at Thermalito Afterbay with implementation of the Proposed Action; therefore, no changes in water quality or water table elevations influencing agricultural resources are expected to occur.

Oroville Facilities operations affect water temperatures and their distribution in Thermalito Afterbay, which affect water temperatures at the agricultural diversions. (See Section 5.4.2.1, Water Quality, Environmental Effects, for additional information on water temperature effects in Thermalito Afterbay.) Project operations that affect Thermalito Afterbay water temperatures include Oroville Dam release water temperatures, and those operational variables that determine the effective reside time of water in the afterbay. Oroville Facilities operations that determine the effective reside time of water in the afterbay include the volume of inflows compared to the total releases from the afterbay (at both the Thermalito Afterbay Outlet and the agricultural diversions), afterbay stage elevations, and the amount of peaking and pumpback. Under the Proposed Action, operations in Thermalito Afterbay would not differ from the operational procedures under the No-Action Alternative. Therefore, Thermalito Afterbay water temperature regime, flows, and effective reside time of water are not expected to change with implementation of the Proposed Action, relative to the No-Action Alternative. In addition, temperatures of water released into Thermalito Afterbay, as well as resulting water temperatures at the agricultural diversion points, are not expected to change with implementation of the Proposed Action. Agricultural production, according to the above qualitative analyses, is therefore not expected to differ with implementation of the Proposed Action from the agricultural production anticipated under No-Action Alternative conditions.

G-LU1.6 ALTERNATIVE 2

G-LU1.6.1 Prime and Other Farmland

The qualitative effects evaluation of Alternative 2 included the potential for conversion of Prime Farmland due to construction activities or project-related erosion, as well as conflicts due to changes in adjacent land use. No construction activities are included with implementation of Alternative 2 that affect Prime or other farmland; therefore, no change in the status of Prime Farmland or other land use designations of lands surrounding the project area are anticipated. Although flows in the Low Flow Channel would be increased under Alternative 2, no net changes in total releases to the lower Feather River would occur with implementation of Alternative 2; therefore, the rate of erosion and conversion of Prime and other farmland is not expected to change from No-Action Alternative conditions. Therefore, no loss of Prime Farmland or other farmland is anticipated with implementation of Alternative 2.

G-LU1.6.2 Agricultural Cultural Practices

With respect to potential effects on agricultural cultural practices, actions associated with implementation of Alternative 2 would be identical to those actions included under the Proposed Action. (See Section 5.8.2.2 for an evaluation of these actions relative to the No-Action Alternative.)

G-LU1.6.3 Agricultural Production

Changes in water quality or groundwater tables were evaluated based on their suitability for agricultural production associated with groundwater quality and depth, as well as crop drainage effects on agricultural resources. Currently, groundwater quality and water table depth do not adversely influence agricultural production in the project vicinity. No changes in project operations are anticipated to occur at Thermalito Afterbay with implementation of Alternative 2; therefore, no changes in water quality or water table elevations influencing agricultural resources are expected to occur.

Under Alternative 2, operations in Thermalito Afterbay would differ from the No-Action Alternative. Alternative 2 includes reduced Thermalito Afterbay releases due to the increase in minimum Low Flow Channel flows (from 600 cubic feet per second [cfs] to 800 cfs), and the increase in Low Flow Channel flows of up to 1,200 cfs from May 1 through June 15. Changes in water temperature targets included in Alternative 2 also would alter the water temperature of project releases. Both of these operational changes associated with implementation of Alternative 2 would change water temperatures in Thermalito Afterbay and therefore at the agricultural diversions.

Under Alternative 2, 200 cfs more project water would be released downstream into the Feather River during most periods of the year. Although the change in project operations is small and does not involve a change to Thermalito Afterbay operations per se, the action has the potential to increase the effective reside time of water in Thermalito Afterbay, providing for an increased duration of opportunity for water to warm in Thermalito Afterbay prior to agricultural diversions. During the May 1 through June 15 period when flows up to 1,200 cfs would be released through the Low Flow Channel, encompassing the majority of the May 1 through June 30 critical period of rice yield water temperature sensitivity, there would be an additional increase in the effective reside time of water in Thermalito Afterbay prior to agricultural diversions. This increased effective reside time should result in some water temperature increases at the agricultural diversions under Alternative 2 when the ambient air temperatures are above the water temperatures in Thermalito Afterbay. Mean daily water temperature modeling data available for the agricultural diversions were not successful in quantifying this increase, but it is expected that there would be some improvement in increased water temperatures for rice production under Alternative 2.

G-LU1.7 REFERENCES

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